

WE CLAIM:

1. An interleaver comprising:

a set leader generator operable to generate set leader values for a set of initial indices, wherein each index within the initial set of indices is associated with an initial position of a bit in an input bit stream;

an inner set index generator operable to generate a permuted index for each initial index based on the set leader values; and

a bit router operable to route each bit in the input bit stream to a randomized position in an output bit stream in accordance with its permuted index.

2. The interleaver as in claim 1 wherein the set leader generator is further operable to generate four set leader values for each set of sixteen initial indices and the inner set index generator is further operable to generate sixteen permuted indices for each four set leader values.

3. The interleaver as in claim 2 wherein the bit router is further operable to route input bits from an input bit stream to randomized positions in an output bit stream using the permuted indices.

4. The interleaver as in claim 1 wherein the set leader generator and inner set generator each comprises a plurality of flip-flops.

5. The interleaver as in claim 1 wherein the bit router comprises an addressable WRITE and an addressable READ, random-access memory (RAM) section.

6. The interleaver as in claim 1, wherein the interleaver comprises a wireless local area network (LAN) modem.

7. The interleaver in claim 1 wherein the set leader generator is further operable to generate a group of subsequent set leader values from four preset set leader values of 0, 13, 24 and 37.

8. The interleaver as in claim 7 wherein the set leader generator is further operable to generate the subsequent set leader values by repeatedly incrementing a first set leader value by 1, repeatedly decrementing a second set leader value by one, or incrementing the second value by three, repeatedly incrementing a third set leader value by one and repeatedly decrementing a fourth set leader value by one, or incrementing the fourth value by three.

9. The interleaver as in claim 1, wherein the set leader values generated by the set leader generator are given by:

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| Index Set | Leader 1 | Leader 2 | Leader 3 | Leader 4 |
|-----------|----------|----------|----------|----------|
| 1 | 0 | 13 | 24 | 37 |
| 2 | 1 | 12 | 25 | 36 |
| 3 | 2 | 15 | 26 | 39 |
| 4 | 3 | 14 | 27 | 38 |
| 5 | 4 | 17 | 28 | 41 |
| 6 | 5 | 16 | 29 | 40 |
| 7 | 6 | 19 | 30 | 43 |
| 8 | 7 | 18 | 31 | 42 |
| 9 | 8 | 21 | 32 | 45 |
| 10 | 9 | 20 | 33 | 44 |
| 11 | 10 | 23 | 34 | 47 |
| 12 | 11 | 22 | 35 | 46 |

10. A permutation-based de-interleaver operable to route randomly positioned bits in a received bit stream to initial positions in an output bit stream based on permuted indices.

11. A method for randomizing burst errors comprising the steps of:

generating set leader values for a set of initial indices, wherein each index within the initial set of indices is associated with an initial position of a bit in an input bit stream;

generating a permuted index for each initial index based on the set leader values;

and

routing each bit in the input bit stream to a randomized position in an output bit stream in accordance with its permuted index.
12. The method as in claim 11 further comprising the steps of generating four set leader values for each set of sixteen initial indices and generating sixteen permuted indices for each four set leader values.
13. The method as in claim 11 further comprising routing input bits from an input bit stream to randomized positions in an output bit stream using the permuted indices.
14. The method as in claim 11 further comprising generating a group of subsequent set leader values from four preset set leader values of 0, 13, 24 and 37.
15. The method as in claim 14 further comprising generating the subsequent set leader values by repeatedly incrementing a first set leader value by 1, repeatedly decrementing a second set leader value by one, or incrementing the second value by three, repeatedly incrementing a third set leader value by one and repeatedly decrementing a fourth set leader value by one, or incrementing the fourth value by three.
16. The method as in claim 11, wherein the set leader values generated by the set leader generation unit are given by:

| Index Set | Leader 1 | Leader 2 | Leader 3 | Leader 4 |
|-----------|----------|----------|----------|----------|
| 1 | 0 | 13 | 24 | 37 |
| 2 | 1 | 12 | 25 | 36 |
| 3 | 2 | 15 | 26 | 39 |
| 4 | 3 | 14 | 27 | 38 |
| 5 | 4 | 17 | 28 | 41 |
| 6 | 5 | 16 | 29 | 40 |
| 7 | 6 | 19 | 30 | 43 |
| 8 | 7 | 18 | 31 | 42 |
| 9 | 8 | 21 | 32 | 45 |
| 10 | 9 | 20 | 33 | 44 |
| 11 | 10 | 23 | 34 | 47 |
| 12 | 11 | 22 | 35 | 46 |

17. A method for randomizing burst errors comprising routing randomly positioned bits in a received bit stream to initial positions in an output bit stream based on permuted indices.

18. A permutation-based interleaver comprising:

means for generating set leader values for a set of initial indices, wherein each index within the initial set of indices is associated with an initial position of a bit in an input bit stream;

means for generating a permuted index for each initial index based on the set leader values; and

means for routing each bit in the input bit stream to a randomized position in an output bit stream in accordance with its permuted index.

19. The interleaver as in claim 18 further comprising means for generating four set leader values for each set of sixteen initial indices and means for generating sixteen permuted indices for each four set leader values.

20. The interleaver as in claim 18 further comprising means for routing input bits from an input bit stream to randomized positions in an output bit stream using the permuted indices.

21. The interleaver as in claim 20 wherein the means for routing comprises an addressable WRITE and an addressable READ, random-access memory (RAM) section.

22. The interleaver as in claim 18, wherein the interleaver comprises a wireless local area network (LAN) modem.

23. The interleaver as in claim 18 further comprises means for generating a group of subsequent set leader values from four preset set leader values of 0, 13, 24 and 37.

24. The interleaver as in claim 23 wherein the means for generating the subsequent set leader values further comprises means for generating said values by repeatedly incrementing a first set leader value by 1, repeatedly decrementing a second set leader value by one, or incrementing the second value by three, repeatedly incrementing a third set leader value by one and repeatedly decrementing a fourth set leader value by one, or incrementing the fourth value by three.

25. The interleaver as in claim 18, wherein the values generated by the means for generating set leader values are given by:

| Index Set | Leader 1 | Leader 2 | Leader 3 | Leader 4 |
|-----------|----------|----------|----------|----------|
| 1 | 0 | 13 | 24 | 37 |
| 2 | 1 | 12 | 25 | 36 |
| 3 | 2 | 15 | 26 | 39 |
| 4 | 3 | 14 | 27 | 38 |
| 5 | 4 | 17 | 28 | 41 |
| 6 | 5 | 16 | 29 | 40 |
| 7 | 6 | 19 | 30 | 43 |
| 8 | 7 | 18 | 31 | 42 |
| 9 | 8 | 21 | 32 | 45 |
| 10 | 9 | 20 | 33 | 44 |
| 11 | 10 | 23 | 34 | 47 |
| 12 | 11 | 22 | 35 | 46 |